Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1-40 (cancelled)

Claim 41 (new): A method of determining the endpoint of an etch layer in a semiconductor element fabrication, wherein said element is comprised of at least a first material layer, a second material layer on said first material layer, said endpoint determining method comprises the steps of:

(i) determining the total emission intensity wavelength of the first material layer;

(ii) determining the total emission intensity wavelength of the second material layer;

(iii) plotting the scalar of the wavelength differential of the first and second material layers;

(iv) choosing the highest peak of wavelength differential as the best range of endpoint detection wavelength;

wherein steps (i) and (ii) are conducted with a recipe which is effective in etching said second material layer;

wherein the first material is nitrogen-rich silicon material has the general empirical formula Si_xN_y, including silicon nitride, Si_3N_4 (hereinafter "SiN"), and the antireflective coating (ARC) layer is a bottom reflective coating (BARC), including organic and inorganic BARC materials;

wherein the recipe includes a plasma etching environment having low source power, low bias power, low pressure and etch chemistries including Cl_2 and O_2; and

wherein the plasma is a decoupled plasma source (DPS) having a pressure at about 0.8Pa (6 mTorr), bias power at about 55W, source power at about 350W, Cl_2 flow rate at about 47 sccm and O_2 flow rate of 47 sccm.

Claim 42 (new): A process for etching an upper layer from a lower layer in the fabrication of a semiconductor element, comprising the steps of:

(i) determining the total emission intensity wavelength of the upper layer;

(ii) determining the total emission intensity wavelength of the lower layer;

(iii) plotting the scalar of the wavelength differential of the upper and lower layers;

(iv) choosing the highest peak of the differential graph as the best range of endpoint detection wavelength;

(v) etching said upper layer using the wavelength chosen according to step (iv) as endpoint detection;

wherein the steps of (i) and (ii) are conducted with a recipe which is effective in etching said upper material layer;

wherein the recipe includes plasma-etching environment having low source power, low bias power, low pressure and etch chemistries including Cl_2 and O_2; and

wherein the plasma is a decoupled plasma source (DPS) having a pressure at about 0.8Pa (6 mTorr), bias power at about 55W, source

power at about 350W, Cl_2 flow rate at about 47 sccm and O_2 flow rate of 47 sccm.

Claim 43 (new): A process for etching an upper layer from a lower layer in the fabrication of a semiconductor element, comprising the steps of:

(i) determining the total emission intensity wavelength of the upper layer;

(ii) determining the total emission intensity wavelength of the lower layer;

(iii) plotting the scalar of the wavelength differential of the upper and lower layers;

(iv) choosing the highest peak of the differential graph as the best range of endpoint detection wavelength;

(v) etching said upper layer using the wavelength chosen according to step (iv) as endpoint detection; and

wherein the etching is conducted in an environment comprising a source power of about 250 – 450W, a bias power of about 40 – 70W, a pressure of about 0.53 – 1.1Pa (4 – 8 mTorr) and a ratio of Cl_2 flow to O_2 flow of about 0.75 – 1.25.

Claim 44 (new): A process for etching an upper layer from a lower layer in the fabrication of a semiconductor element, comprising the steps of:

(i) determining the total emission intensity wavelength of the upper layer;

(ii) determining the total emission intensity wavelength of the lower layer;

(iii) plotting the scalar of the wavelength differential of the upper and lower layers;

(iv) choosing the highest peak of the differential graph as the best range of endpoint detection wavelength;

(v) etching said upper layer using the wavelength chosen according to step (iv) as endpoint detection;

wherein step (i) is conducted in a first etching chamber, including a DPS chamber, provided with online data transmission and control signal;

wherein step (ii) is conducted in a second etching chamber, including a DPS chamber, provided with online data transmission and control signal; and

wherein at least a processor, memory and optionally data storage means are provided in a suitable arrangement to perform steps (iii) and (iv) with the inputs from the first and second etching chambers.

Claim 45 (new): A process for etching an upper layer from a lower layer in the fabrication of a semiconductor element, comprising the steps of:

(i) determining the total emission intensity wavelength of the upper layer, wherein the determination is conducted in a first etching chamber, including a DPS chamber, provided with online data transmission and control signal;

(ii) determining the total emission intensity wavelength of the lower layer, wherein the determination is conducted in a second etching chamber, including a DPS chamber, provided with online data transmission and control signal;

(iii) plotting the scalar of the wavelength differential of the upper and lower layers;

(iv) choosing the highest peak of the differential graph as the best range of endpoint detection wavelength;

wherein at least a processor, memory and optionally data storage means are provided in a suitable arrangement to perform steps (iii) and (iv) with the inputs from the first and second etching chambers; and

(v) etching said upper layer using the wavelength chosen according to step (iv) as endpoint detection, wherein the etching of said upper layer is conducted in a third etching chamber, including a DPS chamber, upon determining the best wavelength in step (iv) as endpoint detection.